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EXAMINER	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/527,963	CEPERKOVIC ET AL.	
	Examiner	**Art Unit**	
	EUENG-NAN YEH	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 August 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-452* is/are pending in the application.

4a) Of the above claim(s) *337-448,451 and 452* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-336,449 and 450* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 August 2009* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *12/6/2006*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

FINAL ACTION

Response to Amendment

1. The following Office Action is responsive to the amendment and remarks received on August 3, 2009. Original claims 337-448, 451, and 452 were cancelled and claims 1-336, 449, and 450 remain pending.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-336, 449, and 450 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is indefinite about the claimed "specified contexts" (e.g. currently amended claim 1, line 10). For purpose of this examination, "specified contexts" will be interpolated as "transformed coefficients".

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-13, 31-34, 56-68, 86-89, 113-125, 143-146, 168-180, 198-201, 225-237, 255-258, 280-292, 310-313, 449, and 450 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Boliek et al. (US 6,141,446) and Ogata et al. (US 5,926,791).

Regarding claims 1 (apparatus), 113 (method), and 225 (article), Boliek discloses a codec system ("This apparatus may be specially constructed for the required purposes, or it may comprise a general purpose computer selectively activated or reconfigured by a computer program stored in the computer. Such a computer program may be stored in a computer readable storage medium, such as, but is not limited to, any type of disk including floppy disks … or any type of media suitable for storing electronic instructions, and each coupled to a computer system bus. The algorithms and displays presented herein are not inherently related to any particular computer or other apparatus. Various general purpose machines may be used with programs in accordance with the teachings herein … In addition, the present invention is not described with reference to any particular programming language. It will be appreciated that a variety of programming languages may be used to implement the teachings of the

invention as described herein" at column 5, line 12. Furthermore, "it is appreciated that throughout the present invention, discussions utilizing terms such as "processing" or "computing" or "calculating" or "determining" or "displaying" or the like, refer to the action and processes of a computer system, or similar electronic computing device, that manipulates and transforms data represented as physical (electronic) quantities within the computer system's registers and memories into other data similarly represented as physical quantities within the computer system memories or registers or other such information storage, transmission or display devices" at column 4, line 66) comprising:

- at least one single-level direct subband transformer for receiving and transforming input data to produce transformation coefficients ("The present invention provides a compression/decompression system having an encoding portion and a decoding portion. The encoding portion is responsible for encoding input data to create compressed data, while the decoding portion is responsible for decoding previously encoded data to produce a reconstructed version of the original input data" at column 9, line 2. As depicted in Boliek figure 2, "FIG. 2 is a block diagram of one embodiment of a compression system of the present invention that employs the binary style. Note the decoding portion of the system operates in reverse order, along with the data flow. Referring to FIG. 2, an input image 201 into a multi-component handling mechanism 211. The multi-component handling mechanism 211 provides optional color space conversion and optional handling of subsampled image components" at column 9, line 40. As depicted in Boliek figure 2, numeral 202, "In the wavelet style, the reversible

wavelets block 202 performs a reversible wavelet transform. The output of block 202 is a series of coefficients" at column 9, line 58. In a summary, "The image data 201 is received and (after optimal multicomponent handling) transformed using reversible wavelets in wavelet transform block 202 ... to produce a series of coefficients representing a multi-resolution decomposition of the image" at column 9, line 65);

- at least one encoding probability estimator coupled to at least one of said at least one single-level direct subband transformer, for receiving the transformation coefficients and estimating probabilities of symbols within specified contexts to produce the probabilities of symbols within the specified contexts (as depicted in Boliek figure 2, numeral 205 context modeling is the probability estimator which receives the transformed coefficients from #202, wherein the context modeling, "[c]ausally available information relative to the current bit to be coded that gives historically- learned information about the current bit, enabling conditional probability estimation for entropy coding" at column 6. Under context model, and the probability estimation is "part of a coding system which tracks the probability within a context" at column 7 under Probability Estimation. "... The embedded data stream is received by the context model 205, which models data in the embedded data stream based on their significance ... The results of ordering and modeling comprise decisions (or symbols) to be coded by the entropy coder 206 ..." at column 10, line 17);

- at least one entropy encoder coupled to at least one of said at least one encoding probability estimator, for receiving and entropy encoding the transformation coefficients using the probabilities of symbols within the specified contexts to produce

encoded data (as depicted in Boliek figure 2, numeral 206 is the entropy encoder, “A device that encodes or decodes a current bit based on a probability estimation. An entropy coder may also be referred to herein as a multi-context binary entropy coder. The context of the current bit is some chosen configuration of "nearby" bits and allows probability estimation for the best representation of the current bit (or multiple bits). In one embodiment, an entropy coder may include a binary coder, a parallel run-length coder or a Huffman coder” at column 6, under entropy coder, and, “Note that the present invention may be used with any binary entropy coder, such as the Q-coder, QM-coder or a high speed parallel coder” at column 11, line 8. See also “…The results of ordering and modeling comprise decisions (or symbols) to be coded by the entropy coder 206 …” at column 10, line 24);

- whereby said fast encoder performs lossless compression (“The present invention provides a lossless compression/decompression system. The present invention may also be configured to perform lossy compression/decompression” at column 9, line 17).

Boliek discussed the delay "In fact, there is a maximum delay between encoding and the production of a compressed output bit” at column 30, line 31. Boliek does not explicitly disclose the data buffer to synchronize data.

Ogata, in the field of endeavor of codec analysis (“This invention relates to a sub-band encoding method and apparatus and a sub-band decoding method and apparatus” at column 1, line 11), teaches the time delay to synchronize data processing as shown in figure 4, numeral 15 is the buffer which can store delayed data and then

send out data at appropriate time, "[t]he delay unit 15 has a pre-set delay time equal to the signal processing time required in the analysis LPF 13_L and the downsampling unit 14_L and, for synchronizing the high frequency band signal $XH_0[j]$ from the first downsampling unit 12_H with the low frequency band signal $XL_1[k]$ and the high frequency band signal $XH_1[k]$ from the second stage downsampling units 14_L, 14_H, delays the high frequency band signal $XH_0[j]$ for a pre-set time and sends the delayed signal to the quantizer 16c" at column 6, line 31. Without departing from the scope and spirit of Ogata's methodology, this delay unit, i.e. buffer, can hold data for a pre-set time to provide synchronization with other data then sends this delayed, i.e. synchronized, data out to next processing.

It would have been obvious at the time the invention was made, that one of ordinary skill in the art would have been motivated to include the codec system Boliek made with the time delay buffer as taught by Ogata, in order to provide appropriate time delay to synchronize data flow as discussed above by Ogata.

Regarding claims 56 (apparatus), 168 (method), and 280 (article) of the decoding system (As the decoding system goes through the substantially same processes as the coding system does and "the decoding portion of the system operates in reverse order, along with the data flow. Referring to FIG. 2" at Boliek column 9, line 42. Please reference to the corresponding encoding process for the discussions).

Regarding claims 2, 114, and 226: - at least one quantizer coupled to at least one of said at least one single-level direct subband transformer, for receiving and quantizing the transformation coefficients to produce quantized transformation coefficients (as depicted in Boliek figure 2, numeral 203, "These coefficients are received by the embedded order quantization block 203" at Boliek column 10, line 7);

- each said encoding probability estimator is coupled to at least one of said at least one quantizer, for receiving the quantized transformation coefficients and estimating the probabilities of symbols within the specified contexts to produce the probabilities of symbols within the specified contexts (as depicted in Boliek figure 2, numerals 203 and 205 are quantizer and probability estimator, respectively and #205 is coupled to #203 to receive quantized coefficients and estimate the probabilities of symbols as discussed in claims 1, 113, and 225 for the probability estimator);

- each said entropy encoder is coupled to at least one of said at least one encoding probability estimator, for receiving and entropy encoding the quantized transformation coefficients using the probabilities of symbols within the specified contexts to produce encoded data (as depicted in Boliek figure 2, entropy encoder #206 is coupled to probability estimator #205. Reference to claims 1, 113, and 225 for the discussion of entropy encoder);

- whereby said fast encoder performs lossy compression ("The present invention provides a lossless compression/decompression system. The present invention may also be configured to perform lossy compression/decompression" at Boliek column 9, line 17).

Regarding decoding claims 57, 169, and 281 (refer to the discussions in claims 2, 114, and 226, See also the discussion in claims 56, 168, and 280).

Regarding claims 3, 115, and 227: - at least one synchronization memory coupled to at least one of said at least one entropy encoder, for receiving and substantially synchronizing the encoded data with a fast encoder to produce synchronized compressed data (as discussed in claims 1, 113, and 225, the delay unit of Ogata figure 4, numeral 15 is the synchronization memory to produce synchronized compressed data);

- said output compressed buffer is coupled to said at least one synchronization memory, for receiving and buffering synchronized compressed data to produce the output compressed data (as discussed in claims 1, 113, and 225, the delay unit of Ogata figure 4, numeral 15 is the compressed buffer for receiving and buffering synchronized data before output to next processing).

Regarding decoding claims 58, 170, and 282 (refer to the discussions in claims 3, 115, and 227. See also the discussion in claims 56, 168, and 280).

Regarding claims 4, 116, and 228, at least one color space converter for converting an original input image to produce the input data (as depicted in Boliek figure

2, numeral 211, “The multi-component handling mechanism 211 provides optional color space conversion” at column 9, line 45).

Regarding decoding claims 59, 171, and 283 (refer to the discussions in claims 4, 116, and 228. See also the discussion in claims 56, 168, and 280).

Regarding claims 5 117, and 229: - a first of said at least one single-level direct subband transformer is coupled to receive and transform the input data to produce transformation coefficients (as depicted in Ogata figure 4, x[i] is the input data and boxes 11H and 11L are the first single-level subband transformer);

- each other of said at least one single-level direct subband transformer is coupled to receive and transform selected transformation coefficients to produce transformed transformation coefficients (as depicted in Ogata figure 4, boxes 13H and 13L are other transformer).

Regarding decoding claims 60, 172, and 284 (refer to the discussions in claims 5 117, and 229. See also the discussion in claims 56, 168, and 280).

Regarding claims 6, 118, and 230, selected transformation coefficients are low-pass transformed for one-dimensional input data (“The input may include image, audio, one-dimensional (e.g., data changing spatially or temporally), two-dimensional (e.g.,

data changing in two spatial directions (or one spatial and one temporal dimension)), or multi-dimensional/multi-spectral data" at Boliek column 1, line 43).

Regarding decoding claims 61, 173, and 285 (refer to the discussions in claims 6, 118, and 230. See also the discussion in claims 56, 168, and 280).

Regarding claims 7, 119, and 231, selected transformation coefficients are low-pass transformed both horizontally and vertically for two-dimensional input data ("The input may include image, audio, one-dimensional (e.g., data changing spatially or temporally), two-dimensional (e.g., data changing in two spatial directions (or one spatial and one temporal dimension)), or multi-dimensional/multi-spectral data" at Boliek column 1, line 43. "The most common way to perform the transform on two-dimensional data, such as an image, is to apply the one-dimensional filters separately, i.e., along the rows and then along the columns. The first level of decomposition leads to four different bands of coefficients, referred to herein as SS, DS, SD, and DD. The letters refer to the smooth (S) and detail (D) filters defined above, which correspond to low (L) and high (H) pass filters respectively. Hence, the SS band consist of coefficients from the smooth filter in both row and column directions" at column Boliek 16, line 45. Furthermore, "In the present invention, each tree comprises the SS coefficients and three subtrees, namely the DS, SD and DD subtrees … The root of each tree is a purely smooth coefficient" at Boliek column 17, line 65).

Regarding decoding claims 62, 174, and 286 (refer to the discussions in claims 7, 119, and 231. See also the discussion in claims 56, 168, and 280).

Regarding claims 8, 120, and 232: said at least one single-level direct subband transformer comprises: at least one direct filter for horizontal filtering; and at least one direct filter for vertical filtering ("The most common way to perform the transform on two-dimensional data, such as an image, is to apply the one-dimensional filters separately, i.e., along the rows and then along the columns. The first level of decomposition leads to four different bands of coefficients, referred to herein as SS, DS, SD, and DD. The letters refer to the smooth (S) and detail (D) filters defined above, which correspond to low (L) and high (H) pass filters respectively. Hence, the SS band consist of coefficients from the smooth filter in both row and column directions" at column Boliek 16, line 45, wherein the row means horizontal direction and column means vertical direction).

Regarding decoding claims 63, 175, and 287 (refer to the discussions in claims 8, 120, and 232. See also the discussion in claims 56, 168, and 280).

Regarding claims 9, 121, and 233: said at least one direct filter for horizontal filtering is different from said at least one direct filter for vertical filtering ("The reversible wavelet transform of the present invention may be implemented using a set of filters. In one embodiment, the filters are a Two-tap low-pass filter and a Six-tap high-pass filter to implement a transform referred to herein as the TS transform, or 2,6 transform. In

another embodiment, the filters are a Two-tap low-pass filter and a Ten-tap high-pass filter to implement a transform referred to herein as the TT transform, or 2,10 transform" at Boliek column 16, line 29).

Regarding decoding claims 64, 176, and 288 (refer to the discussions in 9, 121, and 233. See also the discussion in claims 56, 168, and 280).

Regarding claims 10, 122, and 234: comprises at least one direct non-stationary filter ("One use of the location of edges is for adaptive filtering that preserves edges while reducing ringing artifacts. One way of implementing this is to use the 5-tap low pass filter ..." at Boliek column 40, line 22. Without departing from Boliek's methodology, the adaptive filtering teaches the concept of non-stationary filter or serially coupled non-stationary filter according to the application).

Regarding decoding claims 65, 177, and 289 (refer to the discussions in claims 10, 122, and 234. See also the discussion in claims 56, 168, and 280).

Regarding claims 11, 123, and 235, said at least one single-level direct subband transformer comprises at least one direct filter for filtering (the one direct filter has been discussed in claims 8, 120, and 232).

Regarding claims 66, 178, and 290 (refer to the discussion in claims 11, 123, and 235. See also the discussion in claims 56, 168, and 280).

Regarding claims 12, 124, and 236, said at least one direct filter comprises at least one direct non-stationary filter (the one direct non-stationary filter has been discussed in claims 10, 122, and 234).

Regarding claims 67, 179, and 291 (refer to the discussion in claims 12, 124, and 236. See also the discussion in claims 56, 168, and 280).

Regarding claims 13, 125, and 237, said at least one direct non-stationary filter comprises a plurality of serially coupled direct non-stationary filter cells (the concept of serially coupled direct non-stationary filter cells has been discussed in claims 10, 122, and 234).

Regarding claims 68, 180, and 292 (refer to the discussion in claims 13, 125, and 237. See also the discussion in claims 56, 168, and 280).

Regarding claims 31, 143, and 255, said at least one encoding probability estimator comprises at least one adaptive histogram updating means, for updating an adaptive histogram ("A binary arithmetic coder where additions have been substituted for multiplications and probabilities limited to discrete values and probability estimates

are updated when bits are output" at Boliek column 7, under Q-Coder. Thus, probabilities, i.e. the frequency distribution of the histogram, is updated for each input data which is an adaptive, i.e. wavelet transformed, data).

Regarding decoding claims 86, 198, and 310 (refer to the discussions in claims 31, 143, and 255. See also the discussion in claims 56, 168, and 280).

Regarding claims 32, 144, and 256, a low-pass filter for filtering probabilities selected from a group consisting of: probabilities of occurrences of a current symbol x; and cumulative probabilities of occurrences of all symbols preceding the current symbol x ("The outcome in a binary decision with less Probable than 50% probability. When the two are equally probable, it is unimportant which is designated mps or lps as long as both the encoder and decoder make the same designation" at Boliek column 7, under LPS. Thus, Boliek teaches the concept to calculate probabilities of less probable symbol x, i.e. low-pass filter for cumulative probabilities preceding the current symbol x).

Regarding decoding claims 87, 199, and 311 (refer to the discussions in claims 32, 144, and 256. See also the discussion in claims 56, 168, and 280).

Regarding claims 33, 145, and 257, a dominant pole adapter for adapting a dominant pole of said low-pass filter ("The outcome of a binary decision with more than

50% probability" at Boliek column 7 under MPS, wherein the more than 50% probability is a dominant pole adapter which has dominant, more than 50%, probability).

Regarding decoding claims 88, 200, and 312 (refer to the discussions in claims 33, 145, and 257. See also the discussion in claims 56, 168, and 280).

Regarding claims 34, 146, and 258, dominant pole divider for halving a value of the dominant pole in each adaptation cycle (as discussed in claims 33, 145, and 257, the dominant pole divider can halving, 50%, of probability thus halving the dominant pole in each adaptation cycle).

Regarding decoding claims 89, 201, and 31 (refer to the discussions in claims 34, 146, and 258. See also the discussion in claims 56, 168, and 280).

Regarding claims 449 and 450 ("The present invention also relates to apparatus for performing the operations herein. This apparatus may be specially constructed for the required purposes, or it may comprise a general purpose computer selectively activated or reconfigured by a computer program stored in the computer. Such a computer program may be stored in a computer readable storage medium, such as, but is not limited to, any type of disk including floppy disks, optical disks, CD-ROMs, and magneto-optical disks, read-only memories (ROMs), random access memories (RAMs), EPROMs, EEPROMs, magnetic or optical cards, or any type of media suitable for

storing electronic instructions, and each coupled to a computer system bus … In addition, the present invention is not described with reference to any particular programming language. It will be appreciated that a variety of programming languages may be used to implement the teachings of the invention as described herein" at Boliek column 5, line 10).

6. Claims 40-41, 95-96, 152-153, 207-208, 264-265, and 319-320 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Boliek et al. (US 6,141,446) and Ogata et al. (US 5,926,791) as applied to claims 1, 56, 113, 168, 225, and 280 discussed above, and further in view of Magenheimer et al. (IEEE Transactions on Computers, Vol. 37, No. 8, August 1988, 980-990).

Regarding claims 40, 152, and 264, the Boliek and Ogata combination teaches an entropy codec system. The Boliek and Ogata combination does not explicitly disclose the encoder range divider.

Magenheimer, in the field of endeavor of processing efficiency ("clever programming allows the Hewlett-Packard Precision Architecture integer multiplication and division implementation to provide adequate performance at little or no hardware cost" at page 980 abstract), teaches an efficient way of division "A well-known example is division by a power of 2. On a binary machine, this becomes a matter of shifting … it is usually far faster to do an adjustment and then shift than to go through the general division algorithm for powers of 2. Under the Precision Architecture, division by small powers of 2 can be done in one instruction …" at page 987, left column, first paragraph.

Furthermore, "We are interested in the integer quotient of two numbers, x and y. It is assumed that y is a known constant and that x is a variable. For simplicity in the discussion that follows, assume that x >= 0 and y > 0 ... So we want to compute the function q(x) such that q(x) = Floor (x/y). Our technique is to find an inexpensive way to multiply x by the reciprocal of y ... if x is in the range ky <= x < (k+1)y for some k, then we must have k <= q'(x) = (ax + b) / z < (k+1) ..." at page 987, left column, under section of Division Problem Description for more detail discussion about the division. Without departing from the scope and spirit of Magenheimer's methodology, the variable x can be the range R and the known constant can be the number Total of occurrence of all symbols.

It would have been obvious at the time the invention was made, that one of ordinary skill in the art would have been motivated to include the codec system Boliek and Ogata made with range divider as taught by Magenheimer in order to have a fast processing as stated above by Magenheimer.

Furthermore, as stated by the applicant, "FIG. 39 is a flowchart of the state-of-the-art range encoder, which is together with the state-of-the-art range decoder called OLD CODER, as was disclosed in G. N. N. Martin."Range encoding: and algorithm for removing redundancy from a digitised message," Proc. Video & Data Recording Conf., Southampton, UK, Jul. 24-27, 1979; M. Schindler "A fast renormalization for arithmetic coding," Poster at DDC, Data Compression Conf., Snowbird, Utah, Mar. 30-Apr. 1, 1998; and Internet location http://www.compressconsult.com/rangecoder/." at

specification page 39, line 3. Thus the above stated three references also contain the claimed subject.

Regarding decoding claims 95, 207, and 319 (refer to the discussions in claims 40, 152, and 264. See also the discussion in claims 56, 168, and 280).

Regarding claims 41, 153, and 265, first divider comprises a first right shifter for shifting right said range R for $w_3 = \log_2$ (Total) bit positions ("... shifts are given with respect to this size. A shift of n is a multiplication by 2^n" at Boliek column 21, line 32. For example, the value of R is 64 then the binary representation of R is 1000000 (= 2^6 = 64 = R). If Total is 2 (i.e. 2^1) then the right shifting 1 bit of binary R becomes 100000 (= 2^5 = 32 = R/2^1). If Total is 4 (i.e. 2^2) then the right shifting 2 bits of binary R becomes 10000 (= 2^4 = 16 = R/2^2). And the left shifting is multiplication by 2^n).

Regarding decoding claims 96, 208, and 320 (refer to the discussions in claims 41, 153, and 265. See also the discussion in claims 56, 168, and 280).

Examiner's Comments

7. Claims 14-30, 35-39, 42-55, 69-85, 90-94, 97-112, 126-142, 147-151, 154-167, 181-197, 202-206, 209-224, 238-254, 259-263, 266-279, 293-309, 314-318, and 321-336, would be allowable if amended to overcome the USC 112 rejections set forth in this Office action above and rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is an examiner's statement of reasons for allowance:

The present application comprises the following features in combination with other recited limitations, which the closest prior art of record and the references cited in form PTO-1449 taken either singly or in combination does not teach or suggest:

a) said direct non-stationary filter cell comprises: a filter device; a filter cell input x coupled to said filter device; a filter cell output y coupled to said filter device; a first switch and a second switch coupled to said filter device, having a plurality of controllable positions; and a clock input c coupled to control said first switch and said second switch, for providing a non-stationarity of said direct non-stationary filter cell (dependent claim 14).

b) said at least one entropy encoder is a range encoder, comprising a first multiplier for multiplying a prescaled range r with a number Q(x) selected from a group consisting of: a number U(x) of occurrences of all symbols preceding a current symbol x, to produce a range correction t = r . U(x); and a number u(x) of occurrences of the current symbol x, to produce a range R = r . u(x) (dependent claims 35, 147, 259).

c) said at least one encoding probability estimator comprises: a transformation coefficient C splitter into a sign S and a magnitude M; a magnitude-set index MS determinator coupled to said transformation coefficient C splitter, for determining the magnitude-set index MS using said magnitude M and a magnitude-set table; a residual R determinator, coupled to said transformation coefficient C splitter, for determining a residual R using said magnitude M and said magnitude-set table (dependent claims 42, 154, 266).

d) said inverse non-stationary filter cell comprises: a filter device; a filter cell input x coupled to said filter device; a filter cell output y coupled to said filter device; a first switch and a second switch coupled to said filter device, having a plurality of positions controlled by a clock input c; and a clock input c coupled to control said first switch and said second switch, for providing a non-stationarity of said direct non-stationary filter cell (dependent claim 69).

e) said entropy decoder is a range decoder, comprising a first multiplier for multiplying a prescaled range r with a number Q(x) selected from a group consisting of: a number U(x) of occurrences of all symbols preceding a current symbol x, to produce a range correction t = r . U(x); and a number u(x) of occurrences of the current symbol x, to produce a range R = r . u(x) (dependents claims 90, 202, 314).

f) said entropy decoder is a range decoder, comprising a second divider for dividing a bottom range limit B with a prescaled range r, to produce a range correction t=bottom(B/r) (dependent claims 97, 209, 321).

g) said direct non-stationary cell filtering comprises: filtering using a first direct transfer function in the first cycle; and filtering using a second direct transfer function in the second cycle (dependent claims 126, 238).

h) said inverse non-stationary cell filtering comprises: filtering using a first inverse transfer function in the first cycle; and filtering using a second inverse transfer function in the second cycle (dependent claims 181, 293).

i) The at least one processor to reconstruct transformation coefficient C, using a magnitude-set index MS, a sign S and a residual R (dependent claims 324).

Response to Arguments

a) Summary of Applicant's Remark:

The previous IDS, drawing, specification objections and claims USC § 101 and USC § 112 rejections should be withdrawn in view of the amendment.

Examiner's Response:

Examiner agrees, and the previous IDS, drawing, specification objections and claims USC § 101 and USC § 112 rejections are withdrawn except the 35 U.S.C. 112, second paragraph rejection maintains for claims 1-336, 449, and 450 with the reason discussed at the following response.

b) Summary of Applicant's Remark:

“Instead, the term "specified contexts" should be interpreted as defined in the specification. Support for the term "specified contexts" may be found throughout the specification, and particularly in Figures 32 and 33, in Table 14 on page 35, and at page 11, line 28; page 11, line 32; page 12, line 1; page 18, line 12; page 19, line 17; page 20, line 11; page 20, line 28; page 31, line 5; and page 32, line 4” at Remarks page 127, line 1.

<u>Examiner’s Response</u>:

In response to applicant’s argument that the references fail to show certain features of applicant’s invention, it is noted that the features upon which applicant relies (i.e., specified contexts) are varying in definitions as pointed out by applicant above from 11 places with indefinite meaning. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See In re Van Geuns, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

<u>c) Summary of Applicant’s Remark</u>:

“Regarding claims 1 and 56, the Examiner asserts that the claimed invention would have been obvious in view of Boliek and Ogata. Applicants respectfully disagree. In particular, Applicants note that there are many disadvantages of Boliek in comparison with the claimed invention, such as: i.) huge memory requirements ...” at Remarks page 133, line 3.

“Also, the combination of Boliek (codec system) and Ogata (time delay buffer) would not result in the claimed invention. More specifically, claim 1 recites a new

lossless encoder by utilizing new elements, such as: a direct subband transformer ..." at Remarks page 134, line 6.

"Furthermore, huge differences between adaptive filters and non-stationary filters according to the claimed invention are apparent even starting from adaptive filter basics, such as a definition of an adaptive filter, provided at:
http://en.wikipedia.org/wiki/Adaptive filter" at Remarks page 134, line 21.

Examiner's Response:

Applicant's arguments filed August 3, 2009 have been fully considered but they are not persuasive. Applicant's arguments fail to comply with 37 CFR 1.111(b) because they amount to a general allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references.

Furthermore, Applicant has not submitted claims drawn to limitations, which define the operation and apparatus of Applicant's disclosed invention in manner, which distinguishes over the prior art. As it is Applicant's right to claim as broadly as possible their invention, it is also the Examiner's right to interpret the claim language as broadly as possible. It is the Examiner's position that the detailed functionality that allows for Applicant's invention to overcome the prior art used in the rejection, fails to differentiate in detail how these features of applicant's specification are. It is suggested that Applicant compare the original specification and claim language with the cited prior art used in the rejection section above to draw an amended claim set to further the

prosecution. Examiner reiterates the need for the Applicant to more clearly and distinctly define the claimed invention.

Conclusion

8. Applicant's amendment is rejected in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eueng-nan Yeh whose telephone number is 571-270-1586. The examiner can normally be reached on Monday-Friday 8AM-4:30PM EDT.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vikkram Bali can be reached on 571-272-7415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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